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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No.	29554.3
First Inventor or Application Identifier	Dennis Ray Berman
Title	LEARNING SYSTEM WITH LEARNER-CONSTRUCTED RESPONSE BASED TESTING METHODOLOGY
Express Mail Label No.	EL 418585785US

APPLICATION ELEMENTS
See MPEP chapter 600 concerning utility patent application contents

ADDRESS TO: **Assistant Commissioner for Patents**
Box Patent Application
Washington, DC 20231

1. [X] * **Fee Transmittal Form** *(e.g., PTO/SB/17)*
(Submit an original and a duplicate for fee processing)

2. [X] **Specification** [*Total Pages* 17]
(preferred arrangement set forth below)
- Descriptive title of the Invention
- Cross References to Related Applications
- Statement Regarding Fed sponsored R & D
- Reference to Microfiche Appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings *(if filed)*
- Detailed Description
- Claim(s)
- Abstract of the Disclosure

3. [X] **Drawing(s)** *(35 U.S.C. 113)* [*Total Sheets* 4]

4. **Oath or Declaration** [*Total Pages* 2]

   a. [X] Newly executed (original or copy)

   b. [ ] Copy from a prior application (37 C.F.R. § 1.63(d))
   (for continuation/divisional with Box 16 completed)

   i. [ ] DELETION OF INVENTOR(S)
   Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

   NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

5. [ ] Microfiche Computer Program *(Appendix)*

6. Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all necessary)*

   a. [ ] Computer Readable Copy

   b. [ ] Paper Copy (identical to computer copy)

   c. [ ] Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. [ ] Assignment Papers (cover sheet & document(s))

8. [ ] 37 C.F.R.§3.73(b) Statement [ ] Power of
(when there is an assignee) Attorney

9. [ ] English Translation Document *(if applicable)*

10. [ ] Information Disclosure Statement (IDS)/PTO-1449 [ ] Copies of IDS Citations

11. [ ] Preliminary Amendment

12. [X] Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)

13. [ ] * Small Entity Statement(s) (PTO/SB/09-12) [ ] Statement filed in prior application, Status still proper and desired

14. [ ] Certified Copy of Priority Document(s) *(if foreign priority is claimed)*

15. [X] Other: Express Mail Certificate

16. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in a preliminary amendment:*

[ ] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No. _____/_____

Prior application information Examiner_____ Group / Art Unit. _____

For CONTINUATION or DIVISIONAL APPS only : The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS

[ ] Customer Number or Bar Code Label
(Insert Customer No. or Attach bar code label here)
or [X] Correspondence address below

Name	Lei Chen
	Haynes and Boone, L.L.P.
Address	901 Main Street, Suite 3100
City	Dallas
State	Texas
Zip Code	75202-9918
Country	USA
Telephone	214-651-5025
Fax	214-651-5940

Name (Print/Type)	Lei Chen	Registration No. (Attorney/Agent)	46,615
Signature	*Lei Chen*	Date	10/17/2000

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D-831352.1

JC813 U.S. PTO
09/690223
10/17/00

FEE TRANSMITTAL
for FY 2001

Patent fees are subject to annual revision.

TOTAL AMOUNT OF PAYMENT ($) **382.00**

Complete if Known

Application Number	
Filing Date	
First Named Inventor	**Dennis Ray Berman**
Examiner Name	
Group Art Unit	
Attorney Docket No.	**29554.3**

METHOD OF PAYMENT

1. ☐ The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to.

Deposit Account Number **08-1394**

Deposit Account Name **Haynes and Boone**

[X] Charge Any Additional Fee Required Under 37 CFR 1.16 and 1.17

[X] Applicant claims small entity status See 37 CFR 1 27

2. [X] **Payment Enclosed:**

[X] Check ☐ Credit card ☐ Money Order ☐ Other

FEE CALCULATION

1. BASIC FILING FEE

Large Entity / Small Entity

Fee Code	Fee ($)	Fee Code	Fee ($)	Fee Description	Fee Paid
101	710	201	355	Utility filing fee	**355.00**
106	320	206	160	Design filing fee	
107	490	207	245	Plant filing fee	
108	710	208	355	Reissue filing fee	
114	150	214	75	Provisional filing fee	

SUBTOTAL (1) ($) **355.00**

2. EXTRA CLAIM FEES

	Extra Claims		Fee from below	Fee Paid
Total Claims **23**	-20** = **3**	X	**9**	= **27**
Independent Claims	- 3** =	X		=
Multiple Dependent				=

Large Entity / Small Entity

Fee Code	Fee ($)	Fee Code	Fee ($)	Fee Description
103	18	203	9	Claims in excess of 20
102	80	202	40	Independent claims in excess of 3
104	270	204	135	Multiple dependent claim, if not paid
109	80	209	40	** Reissue independent claims over original patent
110	18	210	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) **27**

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity / Small Entity

Fee Code	Fee ($)	Fee Code	Fee ($)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee or oath	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for *ex parte* reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for reply within first month	
116	390	216	195	Extension for reply within second month	
117	890	217	445	Extension for reply within third month	
118	1,390	218	695	Extension for reply within fourth month	
128	1,890	228	945	Extension for reply within fifth month	
119	310	219	155	Notice of Appeal	
120	310	220	155	Filing a brief in support of an appeal	
121	270	221	135	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive - unavoidable	
141	1,240	241	620	Petition to revive - unintentional	
142	1,240	242	620	Utility issue fee (or reissue)	
143	440	243	220	Design issue fee	
144	600	244	300	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Petitions related to provisional applications	
126	240	126	240	Submission of Information Disclosure Stmt	
581	40	581	40	Recording each patent assignment per property (times number of properties)	
146	710	246	355	Filing a submission after final rejection (37 CFR § 1.129(a))	
149	710	249	355	For each additional invention to be examined (37 CFR § 1 129(b))	
179	710	279	355	Request for Continued Examination (RCE)	
169	900	169	900	Request for expedited examination of a design application	

Other fee (specify) _____

* Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) **0.00**

SUBMITTED BY

Complete (if applicable)

Name (Print/Type)	**Lei Chen**	Registration No. (Attorney/Agent)	**46,615**	Telephone	**214/651-5025**
Signature	*Lei Chen*			Date	**10/17/2000**

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	§	
Dennis Ray Berman	§	
	§	
Serial No.: N/A	§	Examiner: N/A
	§	
Filed: Herewith	§	Group Art Unit: N/A
	§	
For: LEARNING SYSTEM WITH LEARNER-	§	
CONSTRUCTED RESPONSE BASED	§	
TESTING METHODOLOGY	§	

EXPRESS MAIL CERTIFICATE

Box Patent Application
Commissioner for Patents
Washington, D.C. 20231

Express Mail Number:___EL418585785US_____

Date of Deposit: ___October 17, 2000_____

I hereby certify that the following attached papers and fee:

1. Utility Patent Application Transmittal Sheet;

2. Fee Transmittal Sheet (in duplicate);

3. Copy of the Patent Application consisting of __11__ pages of Specification, _5_ pages of Claims and 1 page Abstract of Disclosure;

4. Four (4) Drawing sheets;

5. Copy of Declaration and Power of Attorney;

6. Check in the amount of $382.00;

7. Express Mail Certificate; and

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__Tracy Giroux_____
Typed or Printed Name

_Tracy Giroux_____
Signature

D-831376.1

LEARNING SYSTEM WITH LEARNER-CONSTRUCTED RESPONSE BASED TESTING METHODOLOGY

Inventors: Dennis Ray Berman
4401 Windsor Ridge Drive
Irving, Texas 75083
Citizenship: USA

HAYNES AND BOONE, LLP
901 Main Street, Suite 3100
Dallas, TX 75202-3789
214 651-5533

D-830981.1

LEARNING SYSTEM WITH LEARNER-CONSTRUCTED RESPONSE BASED TESTING METHODOLOGY

Background

This invention relates to systems and methods for personnel training and, more particularly, to supervised or self-administered computer-based training systems that incorporate a learner-constructed response based testing methodology for improved evaluation of knowledge acquisition.

A variety of systems are available for automated learning and training using computers or other personal electronic devices. In current computer mediated learning and training systems, assessment of the "knowledge" gained by the user is carried out by, for example, true/false questions, matching (paired-associate) type questions, multiple choice questions, and marking questions. A multiple choice question differs from a marking question in that a multiple choice question has one correct answer, while a marking question has multiple correct answers. The foregoing question formats are not fully effective as learning aids, nor are they reliable in assessing actual knowledge, for various reasons. For example, in a true/false question, a learner has a fifty-fifty chance of answering correctly by guessing; in a four way multiple choice question, the probability

d-830981   2

of a correct answer through guessing is twenty five percent. Test results thus are not necessarily indicative of actual knowledge.

What is needed, therefore, is a methodology for use in computer based training that provides for improved learning, improved efficiency, and improved reliability in the

5   assessment of a user's actual knowledge of subject matter.

Summary

This invention provides a methodology in which a learner-constructed response is provided in answer to a question presented by the system, the response being evaluated by comparison with pre-defined expected responses and, based upon the evaluation, the

10   system determining whether to proceed to another question or to offer remedial feedback. Such a learner-constructed response based evaluation methodology greatly reduces the potential for "guess-work" based correct responses and improves the training process through remedial feedback and advancement upon demonstration of knowledge.

Evaluation of responses involves identification of predefined keyword data

15   pertaining to the subject matter being tested. Examples include passages of text with important keywords (keywords being defined herein to include one or more words, or phrases, or related words and phrases, or synonyms). Multiple choice questions may also include keywords, such that after the learner completes a sequence of reading material or any kind of current multiple-choice, mix or match, true false questions, the learner is

20   prompted to enter answers to "fill-in-the-blank" or "verbal narrative" questions (a learner-constructed response). The learner entered responses are compared to standard solutions recorded on the system and remedial actions are provided.

The methodology may be used in a specially designed training system or in cooperation with existing computer based training systems. For every "choice" based

25   question (e.g., multiple choice), for example, the methodology may prompt for a "user-constructed response" based upon a question that has associated with it all acceptable correct user-constructed responses to this question, the presentation to the learner being designed to include an area or mechanism for capturing a learner response either in the

form of text or spoken words. The correct response is recognized if the response matches the keyword(s), e.g., primary/related keyword(s) or phrase(s) and/or synonym(s).

In one implementation, a computer program is provided for implementing a learning system with a learner-constructed response based methodology, the program including a presentation process for presenting at least one knowledge topic to the learner and for prompting the learner to enter a learner constructed response thereto; an evaluation information process for providing keyword data that corresponds to the knowledge topic; and an evaluation process for determining, based upon entry of a learner-constructed response to the knowledge topic, success or failure of the learner to know the knowledge topic, the success or failure being determined by comparison of the learner-constructed response with the keyword data.

Brief Description of the Drawings

FIG. 1 is a schematic block diagram illustrating a system for implementing a learning methodology of the present invention.

FIGS. 2A-2C are schematic representations illustrating components and question formats for the learning methodology.

FIGS. 3A and 3B are flow charts illustrating processes of the learning methodology.

Detailed Description

In FIG. 1, the reference numeral 10 refers to a system for implementing a training methodology of the present invention, described in detail below. The system 10 includes a computer 12, having a processor 14 and a memory 16. It is understood that the computer 12 may comprise a personal or desktop computer, a television, a handheld device, or any other suitable electronic device. A display 18 and audio output 20 are connected to the computer. Inputs include a user keyboard 22, a mouse 24, or other suitable devices. The inputs are used for various purposes such as entering information initiated by the user, interacting with a software application running on the computer, etc.

A disc input 26 is provided for providing programming or content for operation on the system 10, it being understood that any suitable media may be contemplated.

Programming, as discussed in detail below for implementing the present learning methodology, is stored on disc input 26 and/or memory 16 and is executed by the system 10. The learning methodology preferably is practiced using the foregoing system components, although it may be practiced with alternative components.

FIGS. 2A-2C illustrate schematically an example implementation of the learning methodology in which presentation information component 28 is associated with evaluation information component 30. A logical file 32 has encoded therein the components 28, 30 (it being understood that they may in some embodiments be encoded in distinct files). A learner evaluation and control program 34, including instructions for presentation control 36 and evaluation control 38, are provided to implement the methodology using the information contained in the file(s) 32. A graphical user interface (GUI) 40 operates with the program 34 for providing the presentation and interaction with the learner, it being understood that the GUI 40 may be implemented using commercially available software including, but not limited to, a web browser. The file(s) 32, program 34, and GUI 40 are understood to operate in conjunction with standard software on the computer 12 of the system 10, and may be stored in memory 16, disk input 26, or as otherwise appropriate for efficient operation.

The presentation information component 28 contains information for presenting the question, and may also include additional instructions, help information and an avenue for capturing learner-constructed responses (e.g., a text area or a record button for voice input). The evaluation information component 30 may include a sequence of phrases and, in one embodiment, these may take the form of standard HTML tags for the display of question information and a sequence of proprietary tags for the encoding of expected key-words or phrases under the "META-DATA" tag in HTML.

Referring to FIGS. 2A and 2B, in one example the presentation information information 28 includes a target knowledge component 42 comprising subject matter

content for presentation (e.g., display) to a learner. As illustrated, example content may comprise a lesson on important sales techniques, to be presented in any variety of ways to the learner (e.g., text, video, graphics, sound). The evaluation information component 30 includes keywords that may include one or more primary keywords and/or phrases,

5 related keywords and/or phrases, and/or synonyms. The keywords may also be formatted to identify negative constructs (wrong answers) and flag them. In the example of FIG. 2B, the evaluation information component includes keyword component 44 as an associated set of words relevant to the target knowledge component 42. For example, keywords may describe one or more words or phrases that express the gist or main

10 concepts of the topic under discussion, or the main concepts of a training session to be conveyed to the learners. Keywords may comprise one word, phrases, multiple associated words, synonyms and/or related phrases. For example, keywords may be organized as an n-tuple of consisting of one main word or phrase, followed by associated synonyms and related phrases. Keywords in the component 44 as illustrated in the

15 example of Fig 2B that correspond to the target knowledge component 42 are empathy, understanding customer needs, relating to customer requirements. It is understood that the authors of "content" for the system 10 will supply the target knowledge for the presentation information component 28 and the keywords for the evaluation information component 30, corresponding to each passage or item to be tested in the component 28.

20 It is understood that the target knowledge of the component 28 may be expressed as text passages, graphics, video, or multiple choice questions, or in some other fashion.

The program 34 enables creation of the components 42, 44 for a desired training session. During the creation of the training "content" the authors are prompted to create different key-words and phrases that best describe the "gist" of the content or embody the

25 essence of the knowledge topic under discussion. These key-words and phrases are utilized for the construction of questions. These key-words may also be analyzed to produce additional key-words, phrases or synonyms, and identify negative constructs (wrong answers).

Referring to FIG. 2C, illustrated are example question formats 46 and 48. Once the target knowledge component 42 is presented to the learner, a series of test questions may be provided to the learner. It is also understood that the target knowledge component 42 may itself take the form of multiple choice or other question or

5   question/answer formats. As illustrated by the question format 48, eventually the learner will be presented with a question format that requires the learner to construct a response to a question about the target knowledge in which the learner must construct the target knowledge in his or her own words. The example illustrated is the format 48 in which the learner is prompted to fill in a blank in response to a displayed question. Other

10   scenarios are similarly envisioned in which the learner must express an answer (audibly or in writing) in his or her own word or words. As described below, the learner's words are evaluated by the system 10 to determine whether remediation, further testing, or advancement to new material is appropriate.

FIG. 3A is a functional block diagram describing steps of an evaluation process

15   300 of the learning methodology as implemented by the program 34 operating on the computer 12 of the system 10, for example. FIG. 3B describes lexical pre-processing of a user-constructed response to eliminate negative, conjunctive, and non-definitive language constructs in the user-constructed response.

Referring to the process 300, in step 302 the learner is prompted to construct the

20   target knowledge (presented previously, as described above) in his or her own words. One example of the prompt is the fill-in-the-blank format 48, above. In step 304, if the learner's response is verbal, the speech is converted into text data. After the learner's response has been fully entered, a comparison can be triggered automatically in a predetermined manner. For example, the learner can hit a particular key on the keyboard

25   (e.g., an "Enter" key) or activate a particular area on the display screen to start the comparison. In step 306, the comparison is performed of the learner's response with the pre-defined key word data contained in the evaluation information component 30 (FIG 2A). The comparison may involve a variety of analyses. For example, the comparison

may:

(1) check for and correct spelling mistakes in the learner-constructed response;

(2) determine whether the correct key word (words, phrases) appear in the learner-constructed response;

(3) determine whether synonyms of missing key word(s) appear in the learner-constructed response;

(4) determine whether related phrases that convey the same meaning as the expected key word(s) or phrases appear in the learner-constructed response;

(5) determine whether there are any incorrect key word(s) or phrases in the learner-constructed response or other negative constructs that might indicate a wrong answer.

A variety of logic selections for evaluation are contemplated. In one example, for purposes of improved learning and expediting the testing, a decision is made in step 308 of whether the learner response fails a lexical analysis (described more fully in FIG. 3B), thereby indicating a possible wrong answer or misunderstanding. If yes, then in step 310 the methodology prompts the user for a positive construct. If not, in step 312 a determination is made whether or not expected keyword(s) are found in the response, albeit not necessarily in the exact way or phraseology preferred. If yes, then the methodology proceeds to step 314 and provides a success message to the evaluation control program and execution returns to the program for testing of other target knowledge topics. If not, then in step 316 a determination is made whether expected related phrase(s) are found in the learner's response (thus indicating a correct or partially correct answer). If yes, execution proceeds to step 314. If not, in step 318 a determination is made whether expected synonym(s) appear in the learner response, thereby indicating a correct or partially correct answer. If yes, execution proceeds to step 314. If not, the methodology proceeds to step 320. In step 320, a "failure" message is sent to the evaluation control program 34.

Possible scenarios of a "failure" message to the evaluation control program 34 are

that the evaluation control program may:

    (1) Proceed to other questions and come back to the question upon which failure
is indicated, until a satisfactory answer is received.

    (2) Offer remedial questions or target information;

    (3) Re-evaluate the learner with a focus on the missed part of the current topic.

Possible scenarios of a "success" message to the evaluation control program 34
are that the evaluation control program may:

    (1) Discontinue further questioning on the target knowledge subject;

    (2) Question the learner on the target knowledge again or in a different way to
confirm understanding.

Referring to FIG. 3B, a lexical pre-processing algorithm 308 (described generally
in FIG. 3A) is provided that eliminates negative, conjunctive, and non-definitive language
constructs in user-constructed responses. In step 322, a user-constructed response is
parsed and scanned for predefined language constructs.

In step 324, if the response contains negative constructs, the learner is prompted in
step 326 for alternative responses. For example, if the learner types "no empathy" or "not
empathy" or "don't XXX" or "can't YYY" a parsing algorithm that looks for "empathy"
or "XXX" or "YYY" will normally flag this as correct even though the negative construct
makes the meaning totally different. Accordingly, step 324 determines that the answer
with the negative construct is incorrect and proceeds to step 326.

If in step 324 there are no negative constructs, in step 328 a determination is made
whether the user-constructed response contains a "conjunctive" construct and, if so, in
step 330 prompts the learner for a single response. As an example, if "and" or "but" or
"or" are included in the answer, to indicate a possible guess or two possible answers, step
328 determines that the user-constructed response is not correct and prompts the learner
in step 330.

If in step 328 there are no conjunctive constructs, a determination in step 332
whether there are non-definite constructs, and if so, prompts the learner for a definite

response. Example non-definite constructs include, e.g., "maybe" or "perhaps."

If in step 332 there are no non-definite constructs, in step 336 execution proceeds to the next phase of the analysis, as further described in step 312 of FIG. 3A (described above).

It is noted that at any given moment during the execution of the above mentioned learning methodology, various information pertaining to the training session or the performance of the learner is collected by the system 10 for different purposes. In one specific case, at the end of a training session, the collected information gives an in-depth view of how well the learner has been trained. The collected information can be analyzed to generate various reports to be delivered to a predetermined interested party. For instance, the analyzed information will help to identify comparative difficulties of different materials or subjects covered in the training session, or provide information on how the learner has performed on a per question basis, etc. A statistical analysis and report can also be generated in a similar fashion based on the performances of a group of learners with regard to the training session. Therefore, the interested party can evaluate the performance of a group of learners to make various decisions such as to determine whether the training session should be revised, or whether the group of learners can be profiled in a certain manner.

In summary, the system 10 provides a learning methodology that improves the speed and retention of learning, and furthermore provides improved accuracy in assessment of the learner. By requiring, perhaps in addition to traditional multiple choice or other testing techniques, a learner-constructed response in which the learner must use his or her own words in answering a question, greater assurance is provided that the learner indeed knows the subject matter. Also, the system allows for refinement of the testing as the learner gets closer to accurate responses, as enabled by the construction of a key word component associated with the target knowledge component, as enabled by the evaluation process.

Although illustrative embodiments of the invention have been shown and

described, other modifications, changes, and substitutions are intended in the foregoing disclosure. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the scope of the invention.

Claims

What is claimed is:

1.   A computer program for implementing a learning system with a learner-constructed response based methodology, comprising:

a presentation process for presenting at least one knowledge topic to the learner and for prompting the learner to enter a learner constructed response thereto;

an evaluation information process for providing keyword data that corresponds to the knowledge topic; and

an evaluation process for determining, based upon entry of a learner-constructed response to the knowledge topic, success or failure of the learner to know the knowledge topic, the success or failure being determined by comparison of the learner-constructed response with the keyword data.

2.   The program of claim 1 wherein the comparison comprises a determination of whether or not expected keyword data appears in the learner-constructed response.

3.   The program of claim 1 wherein the keyword data comprises primary keywords or phrases, related key words or phrases, and synonyms.

4.   The program of claim 1 wherein upon a determination of failure of the learner, remedial information is provided to the learner before the learner is prompted to enter another learner-constructed response.

5.   The program of claim 1 wherein upon a determination of success of the learner, the learner is not further prompted to enter a learner-constructed response for the topic.

1   6.   The program of claim 1 wherein the comparison comprises a

2 determination of whether or not expected keyword data appears in the learner-constructed

3 response, the keyword data comprising at least one exact keyword.

1   7.   The program of claim 1 wherein the comparison comprises a

2 determination of whether or not expected keyword data appears in the learner-constructed

3 response, the keyword data comprising at least one exact phrase.

1   8.   The program of claim 1 wherein the comparison comprises a

2 determination of whether or not expected keyword data appears in the learner-constructed

3 response, the keyword data comprising at least one synonym.

1   9.   The program of claim 1 wherein the comparison comprises a

2 determination of whether or not the learner-constructed response fails a lexical analysis.

1   10.   The program of claim 1 wherein the comparison comprises a

2 determination of whether or not expected keyword data appears in the learner-constructed

3 response, the keyword data comprising at least one related word.

1   11.   The program of claim 1 further comprising a reporting process for

2 analyzing information regarding a performance of at least one learner during the

3 presentation process, the evaluation information process and the evaluation process, and

4 reporting an analyzed result to at least one predetermined party.

1   12.   A method for implementing an automated learning system comprising:

2   presenting at least one knowledge topic to the learner and for prompting the

3 learner to enter a learner constructed response thereto;

4   comparing keyword data that corresponds to the knowledge topic with the learner-

5   constructed response; and

6   determining success or failure of the learner to know the knowledge topic, the

7   success or failure being determined by whether or not expected keyword data appears in

8   the learner-constructed response.

1   13.   The method of claim 12 wherein the keyword data comprises primary

2   keywords or phrases, related key words or phrases, and synonyms.

1   14.   The method of claim 12 wherein upon a determination of failure of the

2   learner, remedial information is provided to the learner before the learner is prompted to

3   enter another learner-constructed response.

1   15.   The method of claim 12 wherein upon a determination of success of the

2   learner, the learner is not further prompted to enter a learner-constructed response for the

3   topic.

1   16.   The program of claim 12 wherein the comparison comprises a

2   determination of whether or not expected keyword data appears in the learner-constructed

3   response, the keyword data comprising at least one exact keyword.

1   17.   The program of claim 12 further comprising collecting information

2   regarding a performance of at least one learner during the presentation process, the

3   evaluation information process and the evaluation process, analyzing the collected

4   information, and reporting an analyzed result to at least one predetermined party.

1   18.   A method for implementing an automated learning system comprising:

2   presenting a series of knowledge topics to the learner and prompting the learner to

3   enter a learner constructed response to each topic;

4   comparing keyword data that corresponds to the knowledge topics with the

5   learner-constructed responses; and

6   determining success or failure of the learner to know each of the knowledge topic,

7   the success or failure being determined by whether or not expected keyword data appears

8   in the learner-constructed response;

9   upon a determination of failure of the learner, providing remedial information to

10   the learner and again prompting the learner to enter a learner-constructed response

11   upon a determination of success of the learner, discontinuing presentation and

12   prompting of the learner regarding the particular knowledge topic;

13   whereupon automated presentation of the series is completed when success is

14   determined for each knowledge topic.

1   19.   The program of claim 18 wherein the comparison comprises a

2   determination of whether or not expected keyword data appears in the learner-constructed

3   response, the keyword data comprising at least one exact keyword.

1   20.   The program of claim 18 wherein the comparison comprises a

2   determination of whether or not expected keyword data appears in the learner-constructed

3   response, the keyword data comprising at least one exact phrase.

1   21.   The program of claim 18 wherein the comparison comprises a

2   determination of whether or not expected keyword data appears in the learner-constructed

3   response, the keyword data comprising at least one synonym.

1   22.   The program of claim 18 wherein the comparison comprises a

2   determination of whether or not the learner-constructed response fails a lexical analysis.

1   23.   The method of claim 18 further comprising:

2   collecting information regarding a performance of at least one learner during the

3   presentation process, the evaluation information process and the evaluation process;

4   analyzing the collected information; and

5   generating a report based on the analyzed information for at least one

6   predetermined party.

LEARNING SYSTEM WITH LEARNER-CONSTRUCTED RESPONSE BASED TESTING METHODOLOGY

5 **<u>ABSTRACT</u>**

A methodology in which a learner-constructed response is provided in answer to a question presented by the system, the response being evaluated by comparison with pre-defined expected responses and, based upon the evaluation, the system determining whether to proceed to another question or to offer remedial feedback. Such a learner-constructed response based evaluation methodology greatly reduces the potential for "guess-work" based correct responses and improves the training process through remedial feedback and advancement upon demonstration of knowledge.

10

10

COMPUTER   12

PROCESSOR   14   MEMORY   16

                                                    DISPLAY   18

                                                    AUDIO   20

KEYBOARD
22

MOUSE   24

DISK   26
INPUT

FIG. 1

Learner Evaluation   34   Single Logical File   32
and Information
Sequence Control
Program   36
                                          Presentation Information   28

GUI /   40
Web   Presentation control
Browser
(Learner)
                                          Evaluation Information
                                          1.   Primary keyword(s) and phrase(s)   30
                   Evaluation control   2.   Related keyword(s) and phrase(s)
                                          3.   Synonym(s)
                              38

FIG. 2A

42

A lesson on important sales techniques (incorporating multi-media components).

44

Key-words for testing
(Empathy, understanding customer-needs, relating to customer requirements), ...
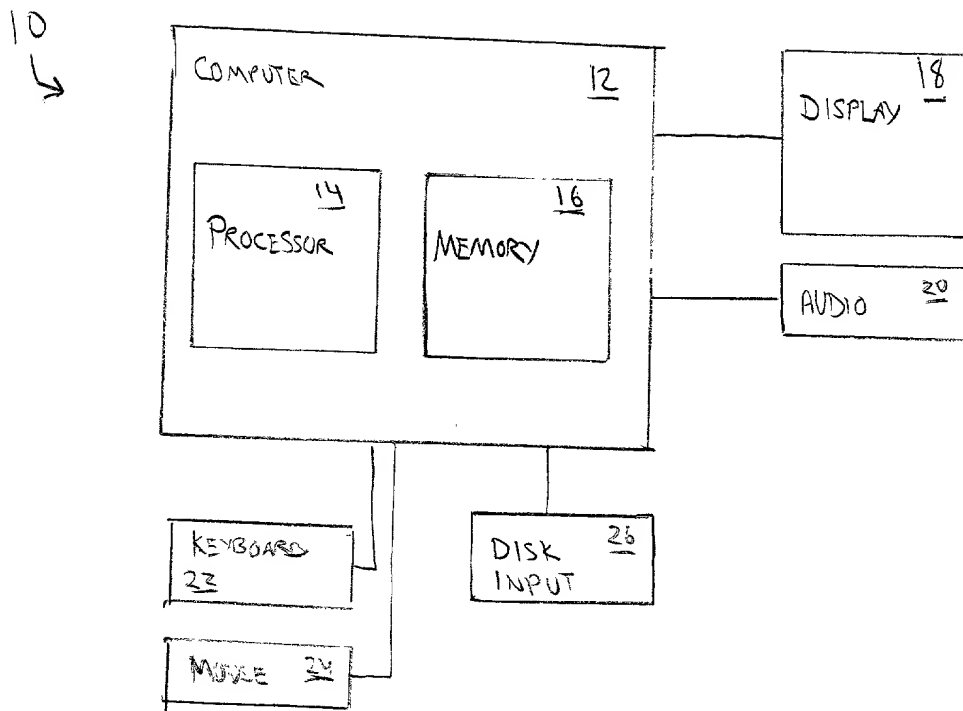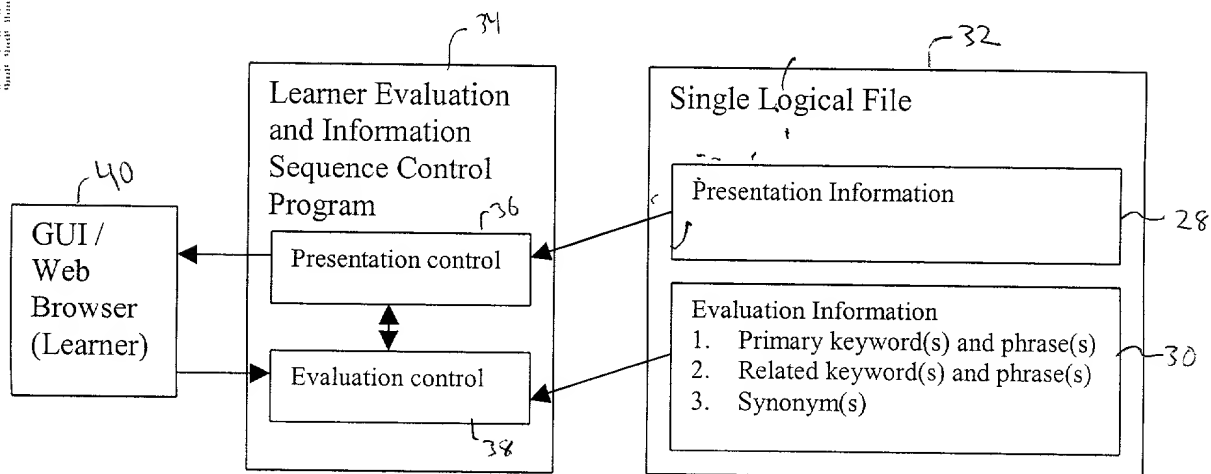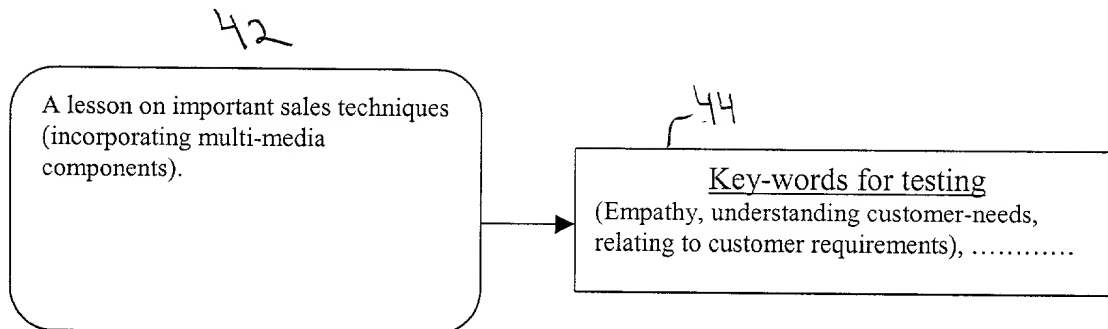
FIG. 2B

46

What is the top requirement for effective sales calls?
- a) Empathy
- b) Apathy
- c) Item 3
- d) Item 4

48

Please type your response to the question
In the box below:

What is the top requirement for effective sales calls?

FIG. 2C

300

~ 34

Learner evaluation and information presentation
sequence control program

~ 302

Learner prompted to construct the target knowledge in
his/her own words.

~ 304

If learner response is verbal, convert speech into text

~ 306

Correct spelling mistake(s) in learner response

~ 308

NO — Does user-constructed response
fail lexical analysis? (Fig 3B) — YES

~ 310

Prompt learner for
alternate response(s)

~ 312

NO — Do expected keyword(s) or
phrases appear in user response? — YES

~ 316

NO — Do expected related phrase(s)
appear in user response? — YES

~ 314

Provide "success" message to
evaluation control program.

~ 318

NO — Do expected synonym(s) appear
in user response? — YES

~ 320

Provide "failure" message to
evaluation control program.

Figure 3A: Evaluation and Verification Process

308

Learner evaluation and information presentation
sequence control program — 34

Parse user-response and scan for predefined "language
constructs". — 322

NO ← Does user-constructed response
contain "negative" constructs? — 324 → YES → Prompt learner for
alternate response(s) — 326

NO ← Does user-constructed response
contain "conjunctive" constructs? — 328 → YES → Prompt learner for a
single response — 330

Does user-constructed response
contain "non-definite" constructs? — 332 → YES → Prompt learner for a
definite response — 334

NO

Proceed to next phase: analysis
of key-words & phrases in user
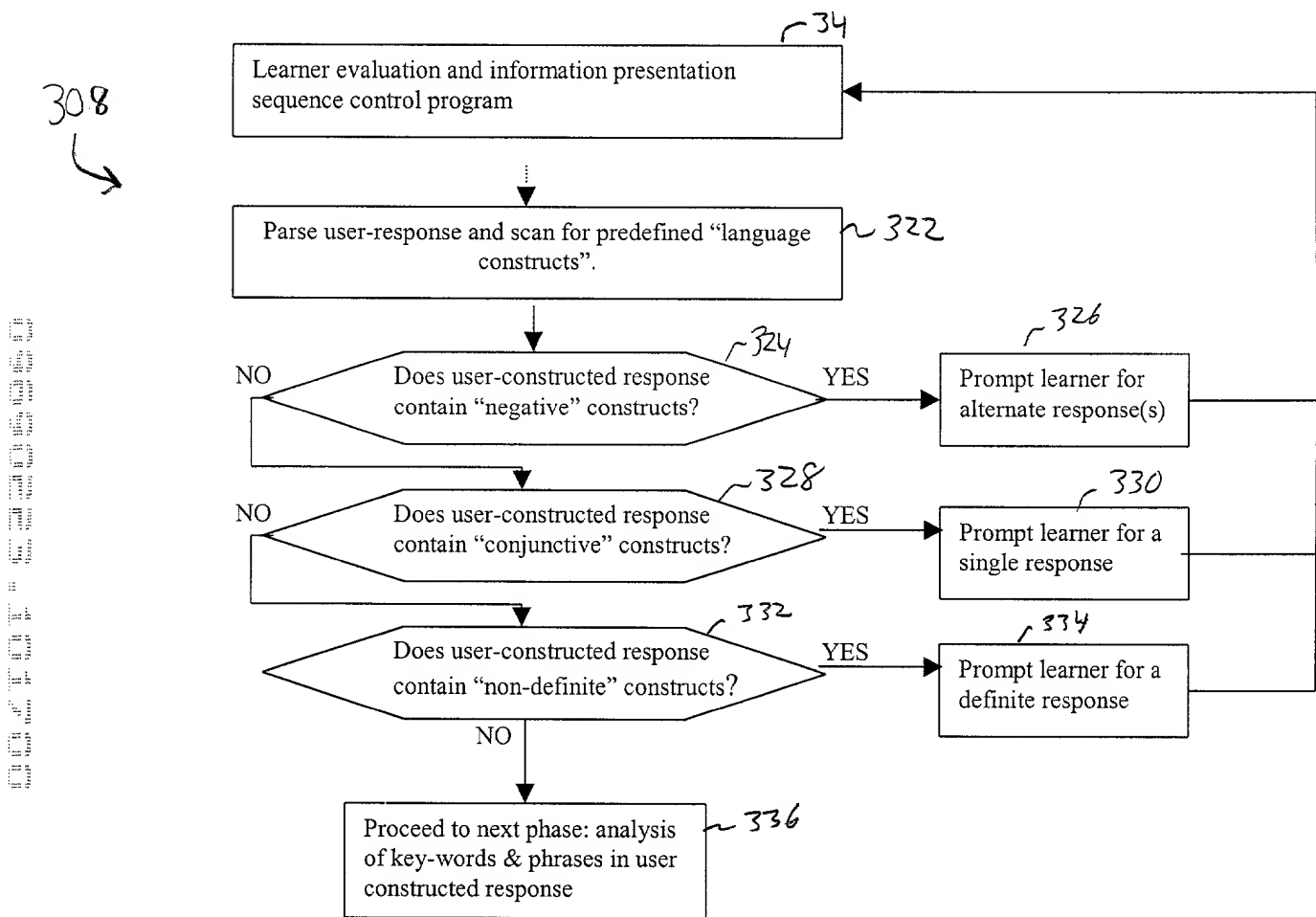constructed response — 336

Fig 3B: Lexical Pre-Processing

DECLARATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled

<div align="center">

LEARNING SYSTEM WITH LEARNER-CONSTRUCTED
RESPONSE BASED TESTING METHODOLOGY

</div>

the specification of which is attached hereto.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.
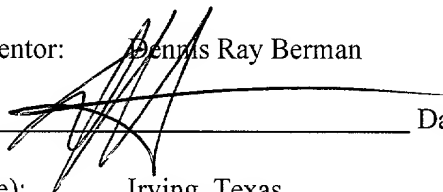
POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the U.S. Patent and Trademark Office connected therewith.

Theodore Baroody	Reg. No. 45,417	Christopher R. Kosh	Reg. No. 42,760
Jeffrey M. Becker	Reg. No. 35,442	Michael J. Balconi-Lamica	Reg. No. 34,291
James R. Bell	Reg. No. 26,528	Todd Mattingly	Reg. No. 40,298
Daniel E. Burke	Reg. No. 46,588	David L. McCombs	Reg. No. 32,271
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Ruben C. DeLeon	Reg. No. 37,812	Michael D. Pegues	Reg. No. 38,993
Brian J. Hubbard	Reg. No. 45,873	Phillip B. Philbin	Reg. No. 35,979
Rita M. Irani	Reg. No. 31,028	Constance M. Pielech	Reg. No. 46,991
Warren B. Kice	Reg. No. 22,732	Brandi W. Sarfatis	Reg. No. 37,713

The above attorneys have full power of substitution and revocation to prosecute this application and to transact all business in the U.S. Patent and Trademark Office connected therewith; and I request that all correspondence be directed to *David L. McCombs*, Haynes and Boone, LLP, 901 Main Street, Suite 3100, Dallas, TX 75202-3789.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole inventor: Dennis Ray Berman

Inventor's signature: _____ Date: Oct 17, 2000

Residence (City, State): Irving, Texas

Citizenship: USA

Post Office Address: 4401 Windsor Ridge Drive, Irving, Texas 75083

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